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Remarks

Applicants have amended claim 1 as shown above and cancelled claims 5-18 without prejudice. Support for the claim 1 amendments can be found in the Written Description at, e.g., page 3, line 29 and page 8, lines 2-29. Following entry of this amendment, claims 1-4 will be pending in this application.

Rejection of Claims 1-4 under 35 USC §112

Claims 1-4 were rejected under 35 USC §112, second paragraph, as being indefinite on grounds that:

"In claim 1, lines 10- 12, Applicants recite "whose lengths along the substrate, ... are not all the same" and the use of the term "whose" lends ambiguity as to what is being referred to even when reading the claim in light of the specification.

Clarification is necessary." (see the Final Rejection at page 2, third paragraph).

Reconsideration is requested. The term "whose lengths" refers to the lengths, measured for a plurality of pick-and-place devices, from a first contact by a point on the surface of a pick-and-place device to the position on the substrate at which the same point of such pick-and-place device again contacts the wet coating. This is further explained in applicants' specification at, e.g., page 4, lines 15-19, page 7, line 23 through page 8, line 7 and page 13, line 27 through page 14, line 9. Claim 1 has been amended to change the word "contact" to "re-contact" in line 8 of the claim and better align the claim language to the wording used in the Written Description. Applicants accordingly request withdrawal of the 35 USC §112, second paragraph rejection of claims 1-4 as being indefinite.

Rejection of Claims 1-4 under 35 USC §103(a)

Claims 1-4 were rejected under 35 USC §103(a) as being unpatentable over U.K. Patent No. 1,278,099 (Hall), on grounds *inter alia* that:

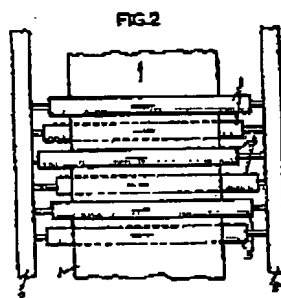
"Hall teaches an apparatus for improving uniformity of a liquid coating on a substrate comprising the combination of at least two or more pick-and-place devices (3; col. 1, lines 41 - 46) that rotationally move or translate in the direction of travel of

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the substrate, the pick and place devices periodically contacting the coating and re-contact said coating at different positions, said positions including the direction of travel of the substrate (see Fig. 3) or the axial direction (see Fig. 4) wherein the pick-and-place devices are out of phase with one another (see claim 5) constituting non-periodically related devices. Even though Hall does not explicitly teach different lengths or distances along which the pick-and-devices contact and recontact the coating on the substrate, one of ordinary skill in the art would expect that the contacting distances or lengths of the devices would be different because the devices are translated or moved out of phase with one another such that the devices are not periodically related along the direction of travel of the substrate.” (see the Final Rejection at page 3, second full paragraph).

Reconsideration is requested. Applicants agree that “Hall does not explicitly teach different lengths or distances along which the pick-and-devices contact and recontact the coating on the substrate”. Hall does not disclose operating the rollers 3 at different rates of speed or with different periods of contact and does not disclose vibrating a plurality of such rollers in the direction of substrate motion and out of phase with one another. A person having ordinary skill in the art who reviewed Hall would recognize that Hall’s description of out of phase continuous movement (and Hall’s description of a mechanical arrangement to carry out such out of phase continuous movement) addresses a particular form of cyclic variation in sideways smearing observed if only two of the three rollers 3 per side in support structure 2 are axially reciprocated. Hall describes this cyclic variation and his solution as follows (see Fig. 2, reproduced below, and page 2, lines 18-55, emphasis added):



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"It is this widening out and thinning of the striations which results in a smoother coating, and the initial improvement imparted by the present reciprocating movements is believed to be due to a sideways thrust imparted to the puddle, thus increasing its effective width and reducing its thickness still further. A secondary effect is that the then largely flattened stripe of coating liquid carried on the surface of the roller is given a sinuous path when transferred to the rising film and the next roller in line is not therefore called upon to deal with a simple vertical stripe. This angular attack of the second roller can be enhanced by arranging the reciprocations of the second roller to move at the same speed but out of phase with those of the first. The effect of this angular attack is still further to spread the surface irregularities, with consequent improvement of smoothness.

"If, however, the horizontal movements of the two smoothing rollers, which are vertically aligned, are arranged in a completely opposite sense, cyclic variations in effect occur. This is due to the fact that the reciprocating movements must, for mechanical reasons, be largely or completely harmonic, so that at the mid-position of the two rollers the sideways smearing effect is at a maximum, whilst near the end-positions where the motions are reversed, there is little or no sideways-smear effect. For this reason, a preferred arrangement is to employ at least three smoothing rollers on each side of the film, each reciprocating at similar speeds and with similar amplitudes but out of phase insofar that at any given moment, one of the rollers is always at or near its maximum horizontal speed and effectiveness."

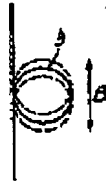
Hall also describes a vertical camshaft arrangement that could be used to cause such out of phase reciprocal axial movement (see e.g., page 2, line 104 through page 3, line 18). Hall says that out of phase reciprocal axial movement is preferred [see e.g., page 1, lines 87-89 and page 2, lines 48-55 (quoted above)], and says that the reason for using out of phase reciprocal axial movement is to overcome cyclic variation in the sideways smearing effect.

Hall separately describes a non-axial roller motion that he calls "vibration" rather than reciprocal movement (see e.g., page 1, lines 80-86 and page 3, lines 19-37, and Fig. 3 which is reproduced below):

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FIG. 3



Hall does not disclose vibrating a plurality of rollers 3 along axis B out of phase with one another, and does not disclose any mechanical arrangement for doing so. A person having ordinary skill in the art who reviewed Hall's reasons for employing out of phase axial reciprocation would not be provided with any basis for concluding that out of phase axis B vibration was necessary. If asked to consider the matter (applicants do not concede that any such consideration would be warranted), a person having ordinary skill in the art would also assume that because the rollers 3 are mounted in support structure 2, they would vibrate together (as with the recited reciprocating movements, such vibrations would, using Hall's words, "for mechanical reasons, be largely or completely harmonic"). If asked to consider the matter (applicants again do not concede that any such consideration would be warranted), a person having ordinary skill in the art would assume that a plurality of the rollers 3 could most conveniently be caused to vibrate along axis B by vibrating support structure 2 rather than the individual rollers 3. A person having ordinary skill in the art would not find any reason or motivation in Hall to vibrate a plurality of the rollers 3 out of phase with one another. Doing so could require that each roller 3 be isolated from support structure 2 and could compromise the precision clearances required for the vertical camshaft and gears described at page 2, line 113 through page 3, line 2 to impart the recited counterrotating and reciprocal axial roller motions.

Notwithstanding the assertions in the Final Rejection, Hall's claim 5 does not teach contacting the coating "at different positions, said positions including the direction of travel of the substrate (see Fig. 3) or the axial direction (see Fig. 4) wherein the pick-and-place devices are out of phase with one another". Hall's Claim 5 depends from Hall's claim 4 which recites that the continuous roller movement "comprises reciprocation in an axial direction". A

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person having ordinary skill in the art would not "expect that the contacting distances or lengths of the devices would be different" and would not expect "that the devices would be translated or moved out of phase with one another such that the devices are not periodically related along the direction of travel of the substrate". No proper basis for such expectations is provided in Hall.

The Final Rejection also asserts that:

"With respect to claims 3 and 4, Hall recognizes two or even five pick-and-place devices being (see col. 1, lines 41-46)." (see the Final Rejection at page 2, third paragraph).

Reconsideration is requested. Hall says nothing regarding the use of rollers with rotational periods that "are not periodically related to one another" as recited in claim 3. Moreover, Hall does not disclose the use of five pick-and-place devices per side in his apparatus. Hall uses three rollers to overcome the above described cyclic variation in the sideways smearing effect. Hall does not provide a reason to use more than three rollers. The cited passage at page 1, lines 41-46 merely says that "in one difficult case it has even been proposed that a minimum of five rollers per side be employed", and is an apparent reference to a prior device and not to Hall's apparatus. The cited proposal is not further described but presumably would involve a device having counter-rotating rollers that all have the same size, turn at the same speed, are not moved along any axis, and do not "periodically contact the wet coating at a first position on the substrate and re-contact the wet coating at positions on the substrate whose lengths along the substrate with respect to the first position are not all the same". Hall does not disclose the subject matter of claim 3 or claim 4

The Final Rejection also asserts that:

"In addition, all the pick-and-place devices can be moved out of phase with one another such that the devices are not periodically related as evidenced by col. 1, lines 80-89." (see the Final Rejection at page 2, third paragraph).

Reconsideration is requested. The cited passage at page 1, lines 80-89 uses the terms "reciprocated" to refer to axial motion transverse to the direction of substrate motion, and

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"vibrated" to refer to motion in other than an axial direction. Hall refers to out of phase motion only in connection with axially reciprocated rollers:

"In one embodiment of the invention the or each roller is both reciprocated in its axial direction transverse to the direction of travel of the film and caused to vibrate in other than the axial direction, e.g. in the vertical or horizontal direction. However, the or each roller may be only reciprocated or only vibrated."

"Preferably, if more than one roller is continuously moved the rollers are reciprocated so that they are out of phase with one another." (see page 1, lines 80-89, emphasis added).

Hall does not teach that a plurality of his rollers 3 can be moved out of phase with one another so as to "periodically contact the wet coating at a first position on the substrate and re-contact the wet coating at positions on the substrate whose lengths along the substrate with respect to the first position are not all the same".

The Final Rejection also asserts that:

"Applicants contend that the Hall arrangement, including rollers (3) all the same size, mounted together, geared together, and spinning at the same speed, would by itself merely repropagate and not reduce [coating] defects as set forth by Applicants' written description at page 10, lines 9-17. This argument is not deemed persuasive because the Hall arrangement is not as simple as Applicants have described above. Hall provides an apparatus including pick-and-place devices substantially as Applicants claim with the exception of disclosure of pick-and-place devices contacting lengths (i.e., distances) being disclosed. However, one skilled in the art would recognize that contacting lengths or distances would be effected by the Hall pick-and-place devices when the devices are translated, out of sync or out of phase, in the travel direction of the substrate. The Hall arrangement would thereby reduce coating defects." (see the Final Rejection at page 4, second paragraph).

Reconsideration is requested. Hall's apparatus is not as sophisticated as averred in the Final Rejection. For the reasons already provided above, Hall does not disclose vibrating a

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plurality of rollers 3 along axis B out of sync or out of phase with one another, and does not disclose any mechanical arrangement or reason for doing so.

The Final Rejection also asserts that:

"Applicants contend that Hall does not show vibrating the two or more rollers in the direction of travel of the substrate to improve down-web uniformity. This argument is not deemed persuasive because while Hall minimally illustrates in Fig. 3, vibrational movement of at least one pick-and-place device in the direction of travel of the substrate, Hall further recognizes that each of the pick-and-place devices can move in the direction of travel of the substrate as evidenced by claim 9. Therefore, one skilled in the art would recognize that Hall also provides for improved down-web uniformity." (see the Final Rejection at page 4, third paragraph).

Reconsideration is requested. Applicants did not "contend that Hall does not show vibrating the two or more rollers in the direction of travel of the substrate to improve down-web uniformity". Applicants did (and still do) contend that:

"Hall does not show vibrating two or more rollers in the direction of film travel and out of phase with one another." (see the April 7, 2005 Amendment at page 9, first paragraph, emphasis added).

Applicants also did (and still do) contend that:

"Hall seeks to thin the coating and smooth out transverse (cross-web) coating thickness variations (see e.g., page 1, line 92 through page 2, line 63). Hall does not discuss reduction of lengthwise (direction of web motion) thickness variations. Put another way, Hall seeks improved cross-web uniformity, not improved down-web uniformity." (see the April 7, 2005 Amendment at page 9, second paragraph, emphasis added).

Even if each of Hall's rollers was vibrated in the direction of substrate travel, doing so would not provide any proper basis for a person having ordinary skill in the art to "recognize that Hall also provides for improved down-web uniformity". No such recognition is provided in or derivable from Hall.

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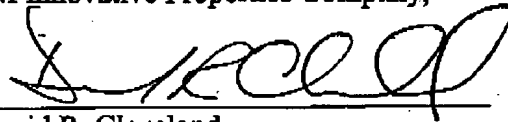
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Hall does not show or suggest the apparatus of claims 1-4. Applicants accordingly request withdrawal of the rejection of Claims 1-4 under 35 USC §103(a) as being unpatentable over Hall.

Conclusion

Applicants have made an earnest effort to address all issues raised in the Final Rejection. Claims 1-4 should be sufficiently clear in view of the explanation provided above. Hall does not show or suggest an apparatus in which a plurality of pick-and-place devices periodically contact a wet coating at a first position on a substrate and re-contact the wet coating at positions on the substrate whose lengths along the substrate with respect to the first position are not all the same. Applicants accordingly request reconsideration and withdrawal of the rejections and passage of their application to the issue branch.

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